

What is claimed is:

1. 1. A method for producing a plasma display panel that has a front substrate and a back substrate disposed to face each other, the method comprising:
  - 4        a pre-baking phosphor layer forming step for forming a pre-baking phosphor layer containing a phosphor and an organic binder, on at least one of surfaces of the front substrate and the back substrate that are to face each other;
  - 8        a sealing material applying step for applying a sealing material that softens with heat, to the peripheral region of at least one of the surfaces of the front and back substrates that are to face each other;
  - 12      a stacking step for disposing the front and back substrates to face each other in a stack; and
  - 14      a baking step for heating the front and back substrates to burn out the organic binder while supplying a dry gas containing oxygen to an internal space that is formed between the front and back substrates.
1. 2. The method of Claim 1, wherein the sealing material is a glass frit that softens at a temperature lower than the highest temperature achieved in the baking step.
1. 3. The method of Claim 2, wherein

2           the glass frit has a softening point of 400 °C or  
3       higher.

1   4. The method of Claim 2 further comprising a preliminary baking  
2       step between the sealing material applying step and the stacking  
3       step, wherein

4           in the preliminary baking step, the glass frit is heated  
5       to a predetermined temperature to be preliminarily baked.

1   5. The method of Claim 1, wherein  
2           the sealing material is a glass frit that is  
3       substantially composed of a crystalline glass.

1   6. The method of Claim 5, wherein  
2           in the baking step, the heating is suspended for a  
3       predetermined time period after a temperature of the front and  
4       back substrates reaches to a predetermined temperature, then the  
5       heating is resumed to burn out the organic binder.

1   7. The method of Claim 1, wherein  
2           at least one of the front and back substrates has  
3       thickness of 2 mm or less.

1   8. The method of Claim 1, wherein  
2           a flow rate of the dry gas supplied to the internal

3 space is 1 CCM per 1 cm<sup>3</sup> of the internal space.

1 9. The method of Claim 8, wherein

2 a flow rate of oxygen contained in the dry gas supplied  
3 to the internal space is 0.5 CCM per 1 cm<sup>3</sup> of the internal  
4 space.

1 10. The method of Claim 1, wherein

2 in the baking step, the front and back substrates are  
3 heated while being secured by pressure applied by a plurality of  
4 pressing units attached to the front and back substrates.

1 11. The method of Claim 10, wherein

2 the plurality of pressing units apply pressure to the  
3 peripheral region of the front and back substrates.

1 12. The method of Claim 11, wherein

2 the plurality of pressing units apply pressure to the  
3 front and back substrates inward of the sealing material,  
4 excluding the central region of the front and back substrates.

1 13. The method of Claim 1 further comprising

2 an exhausting step for exhausting gases from the  
3 internal space, wherein  
4 the exhausting step is started before the front and back

5 substrates cool off to ambient temperature after the baking  
6 step.

1 14. The method of Claim 13, wherein  
2 the exhausting step is completed before the front and  
3 back substrates cool off to ambient temperature after the baking  
4 step.

1 15. The method of Claim 14, wherein  
2 in the exhausting step, gases are exhausted while the  
3 internal space is maintained at a constant temperature.

1 16. A method for producing a plasma display panel that has a  
2 front substrate and a back substrate disposed to face each other,  
3 the method comprising:

4 a pre-baking phosphor layer forming step for forming a  
5 pre-baking phosphor layer containing a phosphor and an organic  
6 binder, on at least one of surfaces of the front substrate and the  
7 back substrate that are to face each other;

8 a sealing material applying step for applying a sealing  
9 material that softens with heat, to the peripheral region of one  
10 of the surfaces of the front and back substrates that are to face  
11 each other;

12 a baking step for burning out the organic binder by  
13 heating the front and back substrates separately disposed in a

14 furnace; and

15 a bonding step for disposing the front and back  
16 substrates to face each other and bonding the front and back  
17 substrates by keeping the front and back substrates being at a  
18 temperature higher than the softening point of the sealing  
19 material.

1 17. The method of Claim 16, wherein

2 in the bonding step, after the front and back substrates  
3 are disposed to face each other, a dry gas containing oxygen is  
4 supplied to an internal space formed between the front and back  
5 substrates.

1 18. The method of Claim 16, wherein

2 the sealing material is a glass frit.

1 19. The method of Claim 18, wherein

2 the glass frit has a softening point of 400 °C or  
3 higher.

1 20. The method of Claim 19, wherein

2 in the bonding step, the front and back substrates are  
3 heated to a temperature in a range of 400 °C to 520 °C.

1 21. The method of Claim 16, wherein

2           in the baking step, the front and back substrates are  
3         heated in an atmosphere of a dry gas.

1   22. The method of Claim 21, wherein  
2           in the baking step, the front and back substrates are  
3         heated in an atmosphere of a circulated dry gas.

1   23. The method of Claim 21, wherein  
2           the dry gas used in the baking step contains oxygen.

1   24. The method of Claim 16, wherein  
2           in the baking step, gases released from the front and  
3         back substrates as the substrates are heated are removed  
4         forcibly.

1   25. The method of Claim 16 further comprising a disposing step  
2         and a separating step in succession between the sealing material  
3         applying step and the baking step, wherein  
4           in the disposing step, the front and back substrates are  
5         disposed to face each other, then  
6           in the separating step, the front and back substrates  
7         are relatively moved apart along a predetermined path, and  
8           in the bonding step, the front and back substrates are  
9         relatively moved together along the predetermined path so that the  
10      front and back substrates are disposed to face each other.

- 1 26. The method of Claim 25, wherein  
2           in the separating step and the bonding step, the front  
3 and back substrates are moved parallel to each other.
- 1 27. The method of Claim 16, wherein  
2           positioning markers are formed on surfaces of the front  
3 and back substrates before the baking step, and  
4           in the bonding step, the front and back substrates are  
5 positioned using the positioning markers so as to face each  
6 other.
- 1 28. The method of Claim 16 further comprising  
2           an exhausting step for exhausting gases from the  
3 internal space, wherein  
4           the exhausting step is started before the front and back  
5 substrates cool off to ambient temperature after the bonding  
6 step.
- 1 29. The method of Claim 28, wherein  
2           the exhausting step is completed before the front and  
3 back substrates cool off to ambient temperature after the baking  
4 step.
- 1 30. The method of Claim 29, wherein

2           n the exhausting step, gases are exhausted while the  
3 internal space is maintained at a constant temperature.

1   31. A plasma display panel production apparatus for use in the  
2 baking step and the bonding step in the method of Claim 16,  
3 comprising:

4           a heating furnace for housing and heating the front and  
5 back substrates disposed to face each other; and  
6           a dry gas supplying mechanism for supplying a dry gas  
7 to an internal space formed between the front and back  
8 substrates.

1   32. The plasma display panel production apparatus of Claim 31  
2 further comprising  
3           an exhausting mechanism for exhausting gases from the  
4 internal space.

1   33. The method of Claim 1 or Claim 16, wherein  
2            $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}$  is used as a phosphor constituting a blue  
3 phosphor layer.

1   34. A plasma display panel produced by the method of Claim 1 or  
2 Claim 16.

1   35. An image display apparatus comprising:

2                   the plasma display panel of Claim 34; and  
3                   a driving circuit for driving the plasma display  
4                   panel.

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